TECHNOLOGY DEPT.

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. L
No. 1293

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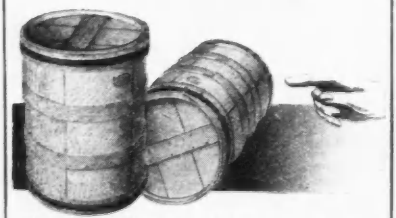

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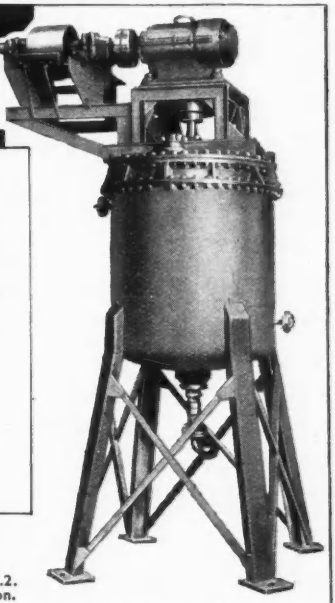

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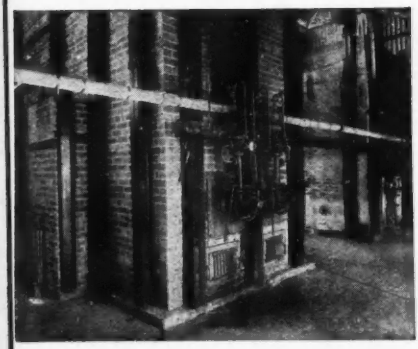

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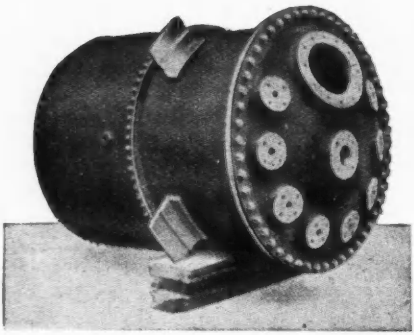

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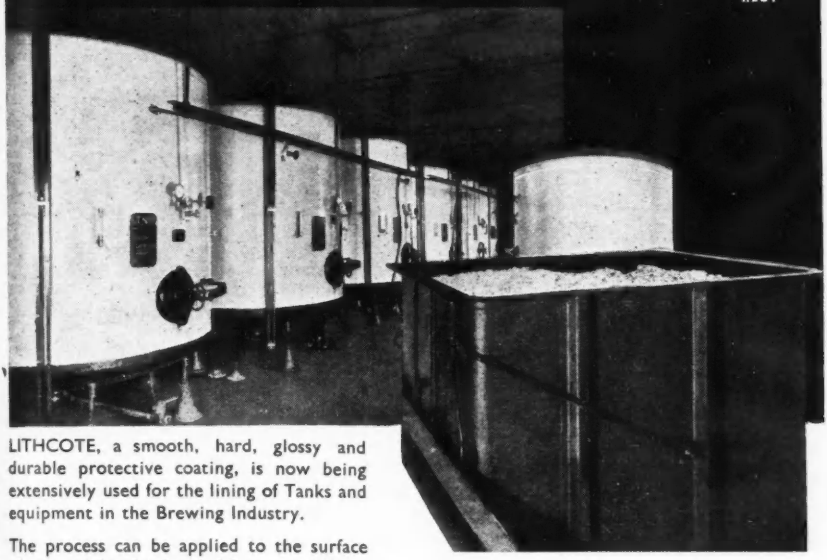

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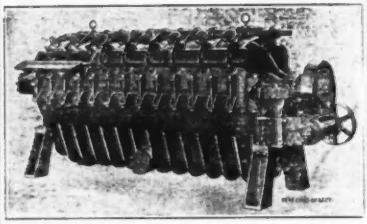

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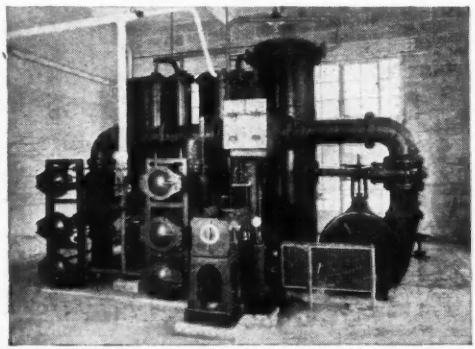

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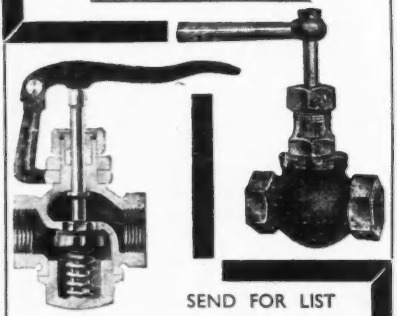

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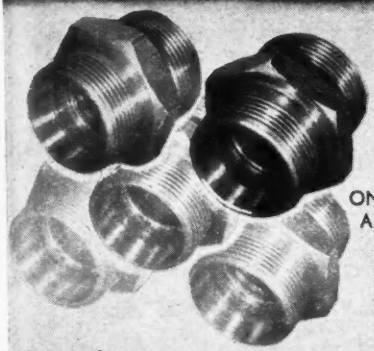

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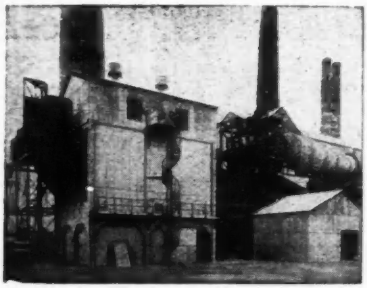

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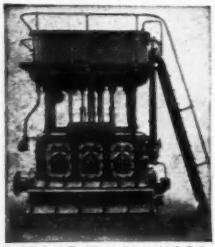

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The Location of Industry

INDUSTRY is being urged by the Government to make its plans for returning to peace production as soon as possible after the war, on the basis that the objective must be to provide full employment for everyone desirous of working. This is no light matter, because it involves the changeover from war to peace production as well as the recapture of markets which we have abandoned under the stress of war. It also implies the development of new processes, new products, and new ideas which we can make use of in this country or sell abroad.

There is at the outset some difficulty in that industry is divided into two sections: (1) What may be termed the "capital-equipment" industries which involve the manufacture of machinery and plant to produce goods; and (2) a whole batch of equally important industries which produce finished articles. If our capital-equipment industries build factories abroad our home industries producing the finished goods are thereupon deprived of a market. It is a matter of considerable difficulty to decide which should have preference. One of the over-riding considerations appears to be that, under pre-war conditions, if a country was asked to provide a plant to produce a particular article and refused to do so, another country would almost certainly jump in and take the order. The ultimate result, therefore, so far as the consumer-goods industry was concerned, was exactly the same, but the capital-equipment industries lost an order and very likely a number of repeat orders. The only solution to this difficulty that we can see at the moment is not altogether satisfactory. It is that the United Nations should decide among themselves which products each country should manufacture (a) for home consumption and (b) for export. If the world was then so divided that each country made use of its natural resources we should be getting somewhere. This solution would not go all the way, of course, because the natural resources of one country may not be sufficient to set up manufacturing processes, since these may involve other substances to complete the process. The manufacture of alloy steels is a good example. There are many countries that possess iron ore but cannot provide the minerals required for the manufacture of alloy steel. We have some doubt, moreover, whether international arrangements of this charac-

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ter, if they are made, will be of long duration. The whole procedure, indeed, savours of dictatorship of the world by a group of industrial nations, and we should doubt whether any such arrangement, unless freely entered into by every nation, would come within the scope of the Atlantic Charter.

An alternative method, and one which recommends itself to us, is that in considering the location of industry British industrialists should not regard this country only but should consider the whole world as a possible site for their works. If a particular product can be made more cheaply in the country in which it can be used because of cheaper labour or cheaper power, or owing to the availability of the raw materials or the lower cost of transport, we should install our factory in that country. If the factory were owned by British capital, so that the profits accrued to this country, and if it were staffed by a proportion of British technical and business men we should be satisfied. It is admitted that this method would probably not provide a great deal of employment for us, but it would find work for the capital-equipment industries in fitting out the factory and in keeping it running.

Coming to this country, there must be some consideration as to the size of industrial units. Is it desirable that small firms should be encouraged or that large firms should be the rule? In the retail distribution trade, although there seems from our experience to be little doubt that the larger units are in general the more efficient, the small shopkeepers serve a useful purpose by providing employment for quite a number of people who would otherwise not be in so happy a position. Even if the result is a little inefficiency and a little higher cost to the purchaser, the system of small shopkeepers has a contribution to make to the national character which we can ill do without. The position of the small manufacturer is a little different, because his business does not depend to the same extent on the goodwill of its customers. Conditions of employment may not be as good in the small concern, though in the well-managed "family" business they are generally very good indeed because the owner knows every man personally. If the small business is to be encouraged, and we can see no reason why it should not be, means will have to be found whereby it can maintain its position on a technical scale in competition with its more powerful associates and competitors. The Research Association movement is one possibility which offers the benefit of scientific assistance at an annual payment well within the scope of even the small concern. The employment of at least one man of scientific attainments who is capable of keeping an eye on developments generally and of advising what applications of these can be made is another means that should not be neglected. There is, in fact, little reason why the small firm in many industries should not flourish and perform useful work. One feels, however, that the major contribution to the industrial development of this country must be made by the larger concerns. The amount of money required for developing new ideas and new processes is beyond the power of small concerns to provide. An essential part of setting up new industries must be the provision of new processes and plants, and it is notably in this direction that the large and powerful concern or amalgamation has shown its value.

It is important, however, to recognise that the industrial set-up of the country will consist both of large and of small concerns and that the geographical position of their works will be important. During the war many new factories have been erected, whole populations have been moved to staff them, and a considerable proportion of these people may well prefer to stay where they now are. If full employment is to be provided, people must be more willing to uproot themselves and migrate to other parts of the country. This is only a small country, and travel after the war will be easy, so that there is no great hardship involved in moving 50 or 100 miles. Nevertheless, it is difficult to persuade people to do so. If the Government could issue in due season a chart showing where war factories have been placed, many manufacturers would be helped because it is obviously cheaper to use an existing building for a new purpose than to build from the foundations. The Government's policy has yet to be declared; meanwhile industrialists must be forgiven if they cannot yet define their post-war plans.

NOTES AND COMMENTS

Carpathian Oil

SO much publicity has been given to the oilfields and refineries of Ploesti that little attention has been directed lately to the 800-odd petroleum fields that are located on the other side of the Carpathians and are being closely threatened by the rapid Russian advance. The principal fields are at Stanislawów, Drohobycz, and Jaslo (going from east to west), and the first is now only a few miles from the Russian vanguard. According to official statistics, the Stanislawów district produced 46,000 tons of crude oil in 1938, and the yearly average for many years past had fluctuated very little from that figure. Drohobycz, on the other hand, was considerably more important, with 325,000 tons in 1938. The Boryslaw oilfield, illustrated in THE CHEMICAL AGE on November 27 last (p. 530) is a section of the Drohobycz area. There had been a steady decline in this field, however, as 1,004,000 tons were produced in 1913, 624,000 in 1928, and 350,000 in 1936. The Jaslo area, on the contrary, has marked a continuous rise: 67,000 tons in 1913, 96,000 in 1932, and 136,000 in 1938. These figures may appear insignificant alongside the Rumanian production; but every ton of crude oil is of importance to the Nazi war machine; and the news, which we may hope to receive any day, that the Russians have entered Stanislawów, will mean one more blow against the tottering German supply position.

Trade Journals for Schools

EDUCATION in chemistry, as in other subjects, should begin at the beginning, and it has been our experience that children of school age are more interested in the careers that are open to them than might appear on the surface. We therefore heartily agree with Mr. Thomas McLachlan, chairman of the London section of the B.A.C., in the remark which he makes concerning school libraries, in his recent message to members of his section. "School libraries," he says, "should be living cells, and not dead places where those working for Oxford and Cambridge scholarships can study the classics." This comment arose from a contribution made by Mr. R. S. Sweeten to the discussion following Dr. Drakeley's address to the section (*see* p. 338 of this issue of THE CHEMICAL AGE). Mr. Sweeten put forward the suggestion that semi-popular trade and scientific journals should form an essential part of the average school library, so that boys and girls might obtain a superficial interest in the various walks of life open to them. Speaking for ourselves, we can truthfully say that we should have welcomed THE CHEMICAL AGE in our own school library, although it was far from being a dead-and-alive place of the kind stigmatised by Mr. McLachlan. Admittedly our interest in the journal would have been superficial, but that superficial interest would have stimulated the desire to know more about what was actually going on in the chemical industry. Intelligent interest is the first step to knowledge, and it is to-day a prime essential to every industry to attract towards it the bright inquiring minds of the rising generation.

C.W.U. Recognised

COLLECTIVE bargaining is to-day an essential feature of industrial organisation, and negotiation between the employers' association and the workers' union is accepted as being the most economical way of settling disputes between management and labour. When an employers' association fails to recognise a union that legitimately claims to represent the workers, or a section of the workers, in a particular industry, a great deal of time is wasted on both sides, since the union has to restrict its negotiations to dealing with individual firms one after another. Such piecemeal bargaining often produces more anomalies than it removes and leads to further differences in wages and working conditions between one works and its neighbour, so that it becomes clear that the refusal of an employers' association to meet the officials of a representative union can prove disruptive of industrial harmony and discipline throughout a whole industry. We are therefore glad to hear that the Association of Chemical Employers has recognised the Chemical Workers' Union to the extent of negotiating with officials of the union in connection with a claim against a Huddersfield firm. A note in

The Chemical Worker describes this meeting, which took place in the Manchester office of the A.C.E. on March 1, as "a historic event," and adds that the atmosphere of the conference was cordial and friendly, and augurs well for the future relationships between this employers' group and the C.W.U. The union sees that this change in relationship is the logical consequence of the A.C.E. decision in the summer of 1943 to advise all their member firms to grant the C.W.U. committee and stewards full negotiation rights within the Chemical Joint Industrial Council. The union journal further pays tribute to "the progressive leadership" of the employers' association, and concludes by suggesting that the stage is now cleared for the A.C.E. and C.W.U. to shape the future destiny of the chemical industry in an atmosphere of goodwill, even though fundamental differences of opinion must remain.

Artificial Diamonds

A CHARACTER in a current West End film talks glibly of diamonds being carbon that has been subjected to high temperatures and high pressures. Where ignorance is bliss . . . ! At the moment there is not one mineralogist who knows for certain how natural diamonds have been produced. They *may* have been produced according to the film star's theory, but until this theory has been confirmed experimentally, by the preparation of artificial diamonds, it remains a theory and does not become an established fact. Of recent months the old controversy as to whether artificial diamonds have been obtained in the laboratory has flamed up again. Dr. Kathleen Lonsdale and Mr. F. A. Bannister of the Royal Institution have examined the residues from the hazardous experiments of J. B. Hannay, and have come to the conclusion that Hannay's crystals were true diamonds. X-ray analysis proved beyond doubt that they were not carbide, as had been suggested. Perhaps the most remarkable point about these crystals is that they are Type II diamonds, with the mosaic form that occurs in only about one per cent. of natural diamonds. If Hannay introduced some small natural diamonds into his experimental material (some of his detractors have argued that he must have done so), how was it that he happened to choose crystals belonging to the very rare Type II diamond? As Dr. C. H. Desch has written, this work of Dr. Lonsdale makes it appear probable that Hannay did in fact obtain diamonds artificially. We cannot help agreeing with Dr. Desch's remark that the observations of Dr. Lonsdale reopen the whole question.

A Challenge to Research

HANNAY'S work will have to be pursued. The fact that the diamond is an allotropic form of carbon was established 150 years ago by Lavoisier and Smithson Tennant. But the conditions which favour the conversion of carbon into diamond still remain unknown. Those who have attempted to discredit Hannay's investigations have created a suspicion that can be eliminated only by repeating his experiments. The idea of producing artificial diamonds is one that has captured the imagination of one scientist after another. Thorpe's *Dictionary* lists more than a dozen names in this connection and, incidentally, omits to mention Hannay. The quest has been an expensive one; Sir Charles Parsons, for instance, spent £50,000 on it, only to come to the conclusion that he had failed to make a synthetic diamond. The great diamond firms, as one might expect, have never encouraged research that might lead to the preparation of a competitive product. Whether it is worth their while to cherish their present ignorance about the stone that brings them their bread and caviare is not so certain, for with greater knowledge of the mode of formation of diamonds would come the power to produce a self-coloured gem instead of one wholly reliant upon the colours it produces by optical refraction. At the moment any attempt to colour diamonds artificially would be doomed to failure. On the other hand, the pure scientists are unlikely to remain content to leave the artificial diamond controversy where it stands. We anticipate that chemistry textbooks of the future will be able to state, on more than a film star's authority, that the diamond is an allotropic form of carbon *and can be produced* therefrom.

FUEL ECONOMY IN THE CHEMICAL INDUSTRY

Fuel Efficiency Lectures

VIII.—Steam Peaks

by DR. E. G. RITCHIE

IN most industrial plants, the demand for steam fluctuates widely, owing to the large number of individual consumers and the intermittent nature of the different processes. The peak-load steam demands in an industrial plant develop and fall off with considerable rapidity. They may rise to double the average demand or more and may last anything from a few seconds to an hour or longer. They have no characteristic shape, they may change from hour to hour and from day to day, they occur at odd intervals and are frequently impossible to predict. They have, however, one thing in common: they impede production and increase the heat consumption per unit of output. Steam-raising plant, of whatever type, is incapable of dealing effectively with variations in demand of the kind usually encountered, as its over-load capacity is limited, while change in firing rate is a slow process in relation to the rate at which the peaks develop and fall off. This results in waste of fuel in the boiler house, loss of productive capacity in the factory, and increase in fuel consumption per unit of output.

Sources of Wastage

Maximum efficiency in the boiler house can only be attained under steady load conditions and with proper attention to combustion and draught control. Where the steam demand fluctuates, frequent changes in firing rate have to be made against a rising or falling pressure gauge, leaving little time or opportunity for controlling combustion or attending to those matters on which high boiler efficiency depends. In a Lancashire boiler, with a fluctuating load, the direct loss of efficiency due to surplus excess air may well amount to 7 or 8 per cent. Safety-valve loss has to be added. This is far more important than is usually assumed. It may be as low as 1 or 2 per cent. of the total amount of steam generated, but, on the other hand, it can be as high as 8 to 10 per cent., as in many steel works and collieries. Other heat losses which assume importance with a widely varying load include those due to high carbon in ash, carry-over, etc. With a fluctuating steam demand, the coal consumption may, therefore, be increased by 10 to 15 per cent. or more, compared with steady load conditions, as a result of the upsetting effect in the boiler house of peaks and valleys. This is not the whole story, as peaks and valleys give rise to steam-pressure variation which results in loss of output and further heat loss in the factory itself. Let us see how this happens.

In a factory with intermittent processes, the first effect of a sudden demand for steam is a local drop in pressure. This is transmitted back to the boiler house and is there translated into a demand for more steam. On its way, however, it causes pressure disturbance throughout the entire pipe system and, as the flow of steam to a consumer depends on the pressure difference between the consumer and the supply main, all the consumers then in operation suffer steam shortage. As a result, the rate of output is reduced. "Steam theft" by one consumer from another is of common occurrence in industry and the consequent loss of output is considerable. Apart from actual loss of output, delay in the completion of a process often affects the quality of the finished article, and wastage and spoilage of material on this account may, and in fact does, occur. In addition, the quality of some industrial products is affected by variations in temperature caused by change in steam pressure, *e.g.*, vulcanised rubber, milk products, etc. Another important factor is that, where severe competition for steam exists, with the building up of heavy peaks priming of the boilers may occur, resulting in the contamination of the process water and the flooding of such units as dye vats, soap pans, etc.

Inevitable Heat Loss

Reference has been made to the fact that fluctuating steam demand and varying pressure retard production. Actually, loss of output on this account is of very great importance in relation to fuel economy. In an industrial plant, under normal operating conditions, only a fraction of the total heat input contributes directly to production. The balance, and often a substantial part of the total, is dissipated. A certain amount of this heat loss is avoidable, but much of it is inevitable. It is required to keep steam mains alive and process plant up to working temperature, it covers faulty technique in the use of heat, and it includes heat which has been de-graded below the temperature at which it can be usefully employed in process work. An important point in this connection is that a large part of the total heat input, including most of the

inevitable heat loss, is fixed and unaffected by the rate of output. The speeding up of production, as a detached and independent consideration, and the distribution of the large fixed heat loss over the maximum possible output, therefore, represents, perhaps, the most important single factor in reducing the fuel cost per ton of product.

We have seen that fluctuations in steam demand may cause an increase in coal consumption of 10 to 15 per cent., due solely to the upsetting effect of peaks and valleys in the boiler house. We have also seen that fluctuations in steam demand give rise to variation in steam pressure which may well reduce the rate of output by 15 to 30 per cent. or more, resulting in an increase in fuel consumption per unit of output of the order of 10 to 20 per cent. The combined effect of a varying load, in the boiler house and in the factory, may therefore well amount to an increase of 20 to 30 per cent. in the coal consumption per ton of product. Increase in the rate of production of an industrial plant and the elimination of anything that tends to restrict it is, therefore, of the utmost importance in relation to fuel economy. A great deal can be done to lessen the evils of peak-load steam demands, but time does not permit me to deal with this in detail. The subject is dealt with exhaustively in a recent Fuel Efficiency Bulletin No. 26 issued by the Ministry of Fuel and Power entitled "Peak Steam Demands—their Cause, Effect and Cure." Prominent points in this Bulletin are as follows.

(a) Study carefully how the peaks are built up. This will often give a clue as to how they may be lessened or eliminated.

(b) Stagger processes to avoid the building up of excessive peaks. Watch what happens in an industrial plant first thing in the morning. The whole day's operations are often handicapped by the scramble for steam in the first hour.

(c) Hot process water often gives a lot of trouble. Make arrangements for preparing this and storing it during off-peak load periods.

(d) See that the boiler plant is on top of its job. Ill-equipped or badly maintained boilers are inefficient with a steady load. They are doubly so with a varying load.

(e) There are many more points, but *read Bulletin No.* 26.

Discussion

Q. What does the author assume to be the normal working capacity of a steam generating plant: 75 or 60 per cent. of the maximum steaming capacity? The author stated that the steam pressure invariably dropped with the oncoming of a peak load. If the boiler plant had sufficient capacity, could this not be avoided by a little anticipation? When designing a new plant with no knowledge as to the nature of the demand and the magnitude of the peak loads, how should the capacity of the boiler be determined?

A. In any circumstances I should always design steam generating plant to be well on top of its job, and I should perhaps decide to load it to about 75 per cent. of its full rated capacity so as to leave something in hand. A great deal would depend on the nature of the peaks which might, for example, last only a few seconds or extend to an hour or more. An abnormal amount of boiler plant would not be economical, but a certain amount of capacity in reserve to take the peak loads would be highly desirable. In this connection, spare boiler equipment under existing conditions might well be brought into operation in order to reduce the boiler rating, to provide a better possibility of meeting the peak loads without drop in pressure. No definite rule can be laid down and each case would have to be considered on its merits.

Effect of Low-Grade Fuels

Q. In the ordinary way, allowing for cleaning, a certain percentage of the installed boiler capacity might well be working for a time above its normal full rated capacity. With low-grade fuels, more frequent cleaning is called for, in addition to which the rating of a boiler would fall rapidly as the flues became fouled. This condition represents a greater handicap so far as the matter concerns the meeting of peak loads. In these circumstances, is not 75 per cent. of the full rated capacity as a normal continuous rating too much to expect? With low-grade fuels it would appear to be necessary to have a larger amount of boiler capacity in reserve than would normally be required.

A. I agree that the situation so far as it concerns low-grade fuels is substantially as indicated.

Q. Many people are considering the use of coke breeze on chain grate stokers. It is often difficult to maintain ignition with coke breeze and, with a peak load, increased steam demand is impossible to meet because of the limitations of the fuel. How can one deal with these substitute fuels?

A. The important point in regard to the use of substitute fuels, in so far as concerns their effect on the raising of steam with boilers already overloaded, is to look for improvement on the process end of the plant and to endeavour by every possible means to reduce the load on the boilers, and particularly to cut down the magnitude of the peaks. The matter is dealt with fully in F.E.C. Bulletin No. 26. Modification of the peaks, either as regards magnitude or time-duration makes a great deal of dif-

ference in the boiler house and this has a material effect on the fuel consumption per unit of output, as reduction of the peaks reduces the variation in steam pressure.

Q. How can the nature of the peaks be determined?

A. This is very difficult under present conditions owing to shortage of staff and the difficulty of obtaining instruments. The only suggestion I have is to make the best use of the facilities available and to try to work things out on a fundamental basis in relation to a given industrial process and the steam required for its completion. Investigation on the process side often enables a certain amount of staggering to be done, which has an important effect in relieving the boiler plant of excessive peaks. I find a stop-watch and a thermometer very useful instruments. Whatever the product may be, it is possible to apply fundamental principles to determine at least approximately what the conditions are, and even if the figures obtained in this way are far from accurate, one learns a great deal in the process. These matters are discussed fairly fully in Bulletin No. 26 from the purely practical angle.

Steam Metering

Q. My case is a little more difficult, because I am concerned with the making of 4000 or 5000 different products and also I am using steam mostly for low-temperature heating at a pressure of 25-30 lb./sq. in., which makes the cost of metering excessive. In the factory with which I am concerned, there are large mains carrying low-pressure steam at fairly low rate, measured in lb. per hour.

A. The best plan in such a case for the measurement of steam flow is to use the simplest type of manometer to discover what is happening. Such instruments can be obtained at very low cost and the advice of the Ministry of Fuel and Power should be sought in this connection.

The chairman here remarked that the question of cheap steam meters had been dealt with by the Fuel Efficiency Committee of the Ministry of Fuel and Power and the type they had advised could be usefully employed in any factory. Absolute accuracy had not been aimed at, the considerations being simplicity and cheapness. The type of steam meter recommended by the F.E.C. through the Ministry would be found most useful.

Q. Can the peak loads be determined from a record of the boiler pressure as representing the reciprocal of the steam demand?

A. Yes, to a limited extent. The method is extremely useful, especially in Lancashire boilers, although the method is equally applicable to water-tube boilers, provided that over a given period of observation the rate of firing and the water level in the boiler are maintained constant. Under these conditions, with a knowledge of the amount of water contained in the boiler, the amount of steam required to meet the peak can be calculated from the amount of steam regenerated by the pressure drop. A pressure recorder is, in any event, a most useful instrument in helping to improve the nature of the steam demand.

Anticipating Peak Loads

Q. As the boiler pressure begins to fall, the feed-water consumption tends to rise slightly. Is not that a ready means of indicating the oncoming of a peak load?

A. Yes, certainly, but perhaps the most useful method of detecting the oncoming of peak loads is to instal in the boiler house a sensitive boiler-pressure gauge, as this shows at once any increase in the steam demand. To be forewarned in this way that a peak is developing is extremely helpful.

Q. What is the relation between boiler pressure and process pressure? Is it not a good plan to generate the steam at high pressure and to allow this pressure to drop to cover the peak loads?

A. Wherever possible this would be done and a boiler pressure considerably in excess of the process should always be used if it can be arranged: for example, in the design of new boiler plants. In this way the boiler plant, particularly if it is of the Lancashire type, forms a great steam accumulator and I personally have always adopted the principle in installing new boilers that these should operate at a higher pressure than was required in process. Such an arrangement gives one ample warning that a peak load is developing, and it is thus met within the capacity of the system without dropping process pressure.

Q. But does the Ministry of Fuel and Power not urge industrialists not to generate steam at higher pressure than is needed?

A. I appreciate the point, but in any event it is necessary, in the majority of industrial plants, to generate steam at considerably higher pressure than is required in process, and to expand the steam down to the desired pressure through a reducing valve. The super-heat developed in the process is not a matter of importance. In many plants, in fact, the boilers generate saturated steam and the effect of passing this, partially wet, through a reducing valve is merely to reduce the moisture content.

Q. Surely, to generate steam at higher pressure than necessary is the very negation of what industrialists have been told by the Ministry.

A. It is true that entropy is increased by passing steam through a reducing valve,

but the reducing valve is a sound and accepted instrument in the lay-out of a works, and an instrument absolutely necessary for the control of process. In many industrial plants, back-pressure power-generating equipment has been installed, and there is a large field for this development. This overcomes the difficulty of increasing the entropy, and the system is one which can, of course, be recommended from every point of view. Even so, peak-load demands for process steam at low pressure have still got to be met by by-passing the power-generating plant through a reducing valve. As a matter of practical necessity, reducing valves must be used in a works, notwithstanding increase in entropy. The use of a reducing valve in the manner suggested is the only possible way to meet the conditions and, in particular, is the only possible way to meet the peak loads.

Q. What is the condition of the steam in regard to cleanliness if pass-out turbines are used as has been suggested?

A. Clean steam can be obtained from pass-out turbines and also from pass-out engines of the non-lubricated type.

Hot-Water Storage

Q. I have replaced steam heating by high-pressure hot-water heating and in this way have reduced the steam consumption of my works by about 50 per cent. The arrangement makes it possible to obtain full use of the latent heat of the steam and, as the boiler is run continuously at full load, its efficiency has been increased by 12 per cent. Steam is used as the heat carrier and water as the heating medium. In this particular case the arrangement adopted has eliminated the peak loads, as steam is injected into a pressure vessel filled with water which is circulated at high temperature. The evaporation of the boiler in this case is about 50,000 lb. per hour and the peak load demand is equivalent to about 15,000 lb. of steam per hour. Is not this sound practice?

A. Yes. F.E.C. Bulletin No. 26 discusses fairly fully the possibility of using hot-water storage for the purpose of eliminating the peaks. In a great many industrial plants, hot water is used for process purposes, but, unfortunately, in many instances the hot water is prepared as it is required. If the hot water were manufactured during off-peak load periods and stored against peak load demands, this would make a great deal of difference to the nature of the steam demand and would help materially in levelling out the peaks and the valleys.

Q. I find that steam-demand charts show whether there is any slacking off at certain periods of the day on the part of operatives. The charts have a real value as an indication as to how the operatives are working.

A. Agreed. The first hour at the beginning of a shift is vital for the rest of the day or shift, and conditions then should be very carefully studied. If operations in a factory are definitely scheduled so far as this concerns their steam requirements, considerable improvements can be effected.

Steam Accumulators

Q. The author has dealt with the question of trying to avoid peak loads, but where they are unavoidable is there not an alternative means of solving the difficulty by resorting to steam accumulation?

A. Yes, the steam accumulator is the final answer to the peak-load problem, but for the duration of the war it would be difficult to justify the installation of steam accumulators, not only on account of the large amount of material they absorb, but also because they take a considerable time to construct and a good deal of additional time to bring into satisfactory operation. The point of my remarks is that by careful study of the conditions in the works a great deal can be done towards the elimination of peak-load demands which may make the installation of a steam accumulator unnecessary, or alternatively may so reduce the steam-storage capacity required as to make the problem of installing an accumulator much easier. Some astonishing results have been achieved by investigating the conditions in a works and observing how processes are brought into operation.

In dyeworks, for example, it is usual to start up the whole of the dye vats simultaneously first thing in the morning. This causes a scramble for steam and the building up of an excessive peak. There is no reason why the vats should not be brought into operation in groups at short intervals of time in order to lessen the morning peak or substantially to eliminate it. This has actually been done in a number of cases. In a sugar refinery the substitution of multiple-effect evaporation for single-effect evaporation levels the steam demand. In steelworks and collieries the peaks due to the engine operation cannot be avoided, but their effect on output and on the performance of the boiler plant can be greatly reduced by ensuring that the boiler plant is on top of its job and not handicapped by a large number of steam leakages and heat losses which can be avoided. There are steelworks in this country in which the effect on the peak loads has been reduced to vanishing-point by the installation of sufficient boiler capacity to cope with the peaks. Another method of tackling the problem is to divide the boiler house into two sections, one supplying the high-pressure consumers and the other the low-pressure consumers. If this is done the pressure on the latter

group of boilers may be allowed to vary and the boilers employed in effect as a steam accumulator to meet the peaks.

Q. Although accumulators are costly in themselves, are they not economic in view of the great fuel saving? The use of accumulators in order to avoid the effect of peak loads appears to be the right answer to the problem. The suggestion was that process units should be staggered in order to avoid the building up of heavy peaks, but would this not rather lead to delay in production?

A. To answer the second question first: when there is a large number of consumers and they all come into operation at one time, production is actually delayed owing to drop in steam pressure. By staggering and thus avoiding steam-pressure drop, production can be increased. It is not the suggestion that staggering should be introduced to the extent of greatly prolonging the time required to complete a process. Peak loads are very largely built up at the start of an operation, and the heavy demand for steam lasts only a relatively short time. In many cases, once the boiler pressure has started to drop, the steam consumption will automatically increase, particularly where power-generating plant is installed, and in this way artificial peaks of considerable magnitude can be built up. The initial drop in steam pressure and its after-effects can thus be prevented by the simple process of staggering the various units The adoption of thermal storage methods is certainly economical but a great deal of capital expenditure can be avoided if at least parts of the peaks are eliminated by any of the methods suggested.

Q. Although accumulators are very costly in the long run, is the author of opinion that it would be economical to instal one?

A. Yes, most decidedly, if everything has been done that can be done to avoid the building up of peaks.

The chairman, in summing up the discussion, emphasised what the author had said regarding the elimination or lessening of steam peaks. The discussion which had developed round the author's suggestions that steam should be generated at a higher pressure than was required in process really crystallised in an acceptance of the lesser of two evils. If peaks were inevitable and other means for smoothing them out were impossible, it was better to accept the loss due to generating steam at a higher pressure than was necessary, than to put up with the greater loss in fuel and in production due to widely varying boiler pressure. He wished to emphasise finally that a great deal of first-rate work had been done in industry during the past two or three years in promoting higher thermal efficiency in the boiler house, but in the view of those competent to judge, greater economy in the use of fuel could be achieved by attention to steam utilisation. The 10 per cent. cut in industrial fuel supplies had emphasised the need for reducing the coal consumption per unit of output by another 10 per cent., and he suggested that attention to steam utilisation, of which peak loads was one facet, would enable that to be done.

[NOTE: Diagrams used to illustrate this talk were taken from the Ministry of Fuel and Power's Bulletin No. 26, to which those interested are referred.]

Luminous Paints

Stability Improved

LUMINESCENT pigments of the class of which zinc-cadmium sulphide is typical cannot, in general, be used in paints or enamels for exterior exposure. A. C. Hetherington, G. W. Lobb, and Imperial Chemical Industries, Ltd., have found, however, that the blackening and loss of luminescence that commonly occur when these coatings are exposed to the atmosphere and light can be reduced, and under certain circumstances overcome, by incorporating an alkaline wetting agent in the paint, *e.g.*, turkey red oil, triethanolamine, and alkaline soaps of fatty acids. According to B.P. 532,319, any one of a number of media may be used for the paints, including vinyl and acrylate polymers, urea-formaldehyde resins, shellac, chlorinated rubber, and cellulose derivatives.

Not more than 5 per cent. by weight of the wetting agent should be added to the paint. The reduction in blackening produced will depend, however, on the amount and also on the alkalinity of the wetting agent. The luminescent pigments concerned are known to be more stable in alkaline media, and it is thought that the action of the wetting agent is to surround each pigment particle with a protective layer, the alkalinity of which protects it from light and atmospheric conditions. Thus the more alkaline agents generally afford the greatest protection, with the exception of substances that affect the compatability of some of the ingredients of the medium; in such cases, a smaller amount of wetting agent can be used, and the *p*H of the medium increased by adding ammonia, for example.

Illustrative formulæ read: (1) 20 parts by weight of butyl methacrylate resin, 50 p. xylol, 4 p. triethanolamine, 70 p. zinc sulphide phosphor; (2) 15 p. methyl methacrylate resin, 30 p. xylol, 30 p. methylethyl ketone, 3 p. turkey red oil, 0.5 p. 10 per cent. ammonia solution, 70 p. zinc-cadmium sulphide phosphor.—*Paint Technology.*

Lac Research

Industrial Chemical Developments

THE annual report of the Indian Lac Research Institute for 1942-43 includes some account of interesting work of the Chemical Section on the improvement and commercial development of several processes.

Moulding powders containing 9 per cent. urea or thiourea and 25 per cent. formalin on the weight of lac have been found to be satisfactory. For moulding articles where a high degree of shock-resistance is not necessary, use of 3 per cent. urea or thiourea and 1 per cent. calcium oxide with 12.5 per cent. formalin on the weight of lac has given suitable powders. The addition of calcium oxide, besides reducing the necessary amount of urea and formalin, improves the hardening of moulded articles at the time of removing from the mould, and imparts to them a better gloss. It has also been found practicable to react and mix the materials between hot rollers instead of in a still in the presence of denatured spirit.

Grinding Wheels

An improved process worked out at the Institute has counteracted the tendency of shellac grinding wheels to burst at high speeds (Pat. Appl. No. 29195, 1942). The binder used is shellac-formaldehyde-urea varnish. Emery powder of the requisite fineness is mixed with the varnish in such a proportion that the resin content is 10-12 per cent. of the total weight; the resulting mass is air-dried and then dried at 90° C. for one hour. The lumps, if any, are broken and the powder filled in suitable moulds and pressed at 2-2½ tons/sq. in. at 140° C. The mould is opened when cold, the wheel is taken out and baked progressively in successive stages at 90° C. for 2 hrs. and at 140° for 2 hrs.

Urea Manufacture

The erection of a pilot plant for the manufacture of formaldehyde has been completed, and experiments are in progress to determine the best working conditions for satisfactory yield. The problem of preparing urea either in small or large quantities has been satisfactorily solved by a new method of making the same from ammonium carbonate, instead of ammonium carbamate as previously reported. The starting materials in this case are ordinary soda and ammonium sulphate, both of which are available in India. This process has the additional merit of not involving any moving parts such as compressors, and was put into small-scale operation in a pilot plant made at the Institute, capable of producing 24 lb. of carbonate a day. The carbonate obtained is found to contain 38-40 per cent. ammonia, which is about 4-6 per cent. above the expected theoretical figure, mainly because a certain amount of carbamate is produced along with the carbonate. This high ammonia content of the parent substance results in the yield of urea being as high at 20-22 per cent., while with commercial ammonium carbonate, which is mostly bicarbonate containing 19-20 per cent. ammonia, the yield of urea is only 6.5 per cent.

Special Varnishes

Among the *ad hoc* investigations undertaken, it has been found that a shellac-formaldehyde-urea varnish can be used to bind several layers of unsized paper into composite sheets from which identity discs, insulating boards, etc., may be punched. Jute boards have been prepared by using a core of jute waste, bound together by an ammoniacal lac solution between two layers of hessian cloth impregnated with shellac-fatty-acid-urea varnish; a finishing varnish is used to seal the edges and give a smooth and glossy surface. Such boards absorb only 0.9 per cent. water on 48 hours' immersion. Samples undergoing weathering tests have been found to be unaffected at the end of eight weeks; the test is being continued.

The special varnish used in a patent zincographic process for photolithography being no longer obtainable on the outbreak of war, a substitute was sought to satisfy the requirements of a Calcutta firm. After trials, samples of two varnishes were sent to the firm, one consisting of shellac and the other of rosin. The shellac varnish was reported to give quite satisfactory results as a substitute for the imported varnish. Further trials will be carried out for fixing the concentration, solvent composition, etc., before advertising the possibilities of shellac in this field.

ACRYLIC RESINS

A note in *Paint Technology* states that the 100th anniversary of the discovery of acrylic acid has just been celebrated by the Röhm and Haas Company in America. It was not, however, until 1927 that acrylic acid resins were used for safety-glass lamination. In addition to their well-known use as unbreakable glass in aircraft, they are used for surface coatings and as adhesives. A recent chemical development is for improving the viscosity of hydrocarbon oils; addition of these acrylic compounds to lubricating oils makes them suitable for either summer or winter use in cars.

Portugal exported some 150 tons of tin and 800 tons of chrome ore to Spain last year. According to a recent answer of the Parliamentary Secretary to the Ministry of Economic Warfare, no re-export of these commodities to Germany has occurred.

Availability of Scientific Information

A Suggested Solution to the Problem

by S. C. BRADFORD, D.Sc., F.L.A.

ALREADY means of ascertaining what information has been published on any topic is of the highest importance to every investigator. Accumulated knowledge is lying dormant and untapped for want of a subject index wherewith to find it. The provision of such an index is one of the special aims of the British Society for International Bibliography.

There are two main difficulties to overcome. First, the difficulty in tracing the references to previous work on a particular subject. This is due, in the main, to the almost complete lack of uniformity in the classification of present abstracts and subject references to literature. The difficulty could be removed by the general adoption of the Universal Decimal Classification, as an international language, to unify the classification of abstracts and references, so that they fit together into a single index, where all references to information on a particular topic fall into one place and can be found without search. Secondly, there is the difficulty that only about one-third of the useful scientific and technical papers published is indexed, although the total number of abstracts and references to such papers is equal to the number of papers themselves. The cause of this omission is partly the lack of a complete library service. Not all periodicals containing useful papers are filed in this country, and not all those that are filed in libraries are available for abstracting, consultation, loan, and the making of bibliographies and digests.

The Scattering of Information

The shortcomings of abstracts are mainly due to the fact that all branches of science are related, and any paper, in any periodical, may be of interest from the point of view of a branch of science quite distinct from that covered by the periodical in question. So that useful papers, on any limited subject of study, are scattered throughout the mass of 15,000 current scientific and technical journals of value, according to a definite law of scattering. This law is described in *Publication No. 1* of the Society. Consequently, as independent Abstracting Bureaux deal only with subjects within their own particular fields, and it is not possible to pick up scattered references from abstracts devoted to other subjects, there is no way whatever of making a list of papers on any branch of science, large or small, without going through the whole mass of 15,000 current periodicals one by one. As this is impossible for any existing Abstracting Bureau, no bureau *can* extract more than a fraction of the literature of its special subject.

Thus we see that there are, in this complicated world, three things needful:

(1) To provide a complete library service;

(2) To secure that every useful paper in every periodical is dealt with; and

(3) To classify all papers by the same system; and all sensible people will agree that this system must be the Universal Decimal Classification. When, recently, it was attempted to establish a rival International Institute of Documentations in Paris, with a new classification, the project was defeated and the representatives of more than thirty Governments decided unanimously to establish the International Federation for Documentation, which controls the Universal Decimal Classification, as the international bibliographical body.

Complete Library Service

It remains then to provide the complete library service and to secure that every useful paper is considered for abstracting, or indexing. This latter undertaking can be achieved in two ways:

(1) We may set up an organisation to abstract, or index, consecutively every useful paper in every periodical, irrespective of subject; or

(2) We may seek, as the Society is doing, to utilise the services of existing, autonomous, self-supporting, bibliographical agencies, which, together, produce already as many references as we need.

The objections to the first course are:

(1) It would duplicate work already done by existing abstracting services and tend to make it redundant.

(2) General abstracts, prepared by the centre, would be less useful for particular purposes than special abstracts produced by specialist bureaux.

(3) The cost of the organisation might be prohibitive. A complete index to pure and applied science without abstracts would be seven times as great as the *International Catalogue of Scientific Literature* and might be expected to incur a proportionate loss, if, indeed, the money were forthcoming. The actual cost of a complete *Catalogue* would be of the order of £40,000 a year for an edition of 1000 copies, or £40 a set. This includes cataloguing, classifying, printing, proof correction, editing and overhead expenses, without the cost of making any indexes, which would not be necessary. And this would apply to science and technology only. If *abstracts* of all the papers were

included, the total cost of an edition of 1000 copies would be about five times as great, or of the order of £190,000 a year, or £190 a set.

(4) Finally, the whole undertaking, actuated from a single centre, would fall to the ground, if the centre should be inhibited in any way, as actually happened to the *International Catalogue*.

On the other hand, to make use of completely autonomous, self-supporting existing, undertakings, has none of these disadvantages. Should one of them cease publication, the rest continue to function, and only one section of the index is affected. The cost of the scheme would be incomparably less, because the agencies are already self-supporting, and economies introduced by collaboration would reduce, or even eliminate, the extra cost of covering additional papers, *even if abstracts from different points of view were retained*. And the present staff is already experienced in the work.

All that is required by this method is *to allocate all periodicals containing useful papers among the existing bibliographical agencies, according to their scope, so that every paper in every periodical is scrutinised, and to arrange that each abstracting service deals, as now, with the papers within its field and passes title references of all other papers to the appropriate bureaux for consideration*. If, in addition, the Decimal Classification numbers were added to the abstracts or index entries, the whole would fit together into a necessarily complete index to information. No cheaper, more permanent or more comprehensive scheme could be devised. Therefore, the Society has adopted this second plan.

The Society's Work

Since its foundation in 1927, as the British National Section of the International Federation for Documentation, the British Society for International Bibliography has worked steadily on these lines and made most satisfactory progress.

(1) It has been successful in inducing about thirty bibliographical institutions in this country to adopt the Decimal Classification for classifying their abstracts and references. So that, with a rather larger number of unified undertakings abroad, already some 150,000 references to scientific and technical literature are classified by the Decimal Classification annually. This number of classified references is actually three-fifths of the 250,000 different papers abstracted by all the existing bureaux and 50 per cent. more than the 100,000 index references published by the *International Catalogue* during the last few years of its existence. These 150,000 classified references are incorporated in the card index in the Science Library, which now includes some 2,000,000 entries. We may claim that this part of the work of the Society of promoting the production of a unified index of the literature of pure and applied science is already more than half accomplished.

(2) As the progress of this work of increasing the use of the Decimal Classification was hampered by the lack of an English edition, the Society has most fortunately been able to arrange for the preparation and publication of an English edition by the British Standards Institution, as a British Standard. The Association of Special Libraries and Information Bureaux is collaborating in this work.

(3) The essential function of libraries in this scheme has been studied and described in *Publication No. 2* of the Society.

(4) To secure the necessary collaboration of bibliographical undertakings in the compilation of a complete index, the Society has set up a *Committee for Co-ordinating the Cataloguing of Scientific and Technical Literature* on which the major abstracting agencies are represented, and work is in active progress.

Bibliographical References

(5) Finally, the Society has been instrumental in creating the nucleus of a service for the supply of comprehensive lists of papers, or digests of work on particular topics. A full service must be founded on a complete index to recorded information and a complete set of the records. The nucleus is based on the forty million bibliographical references in the Science Library and its large collection of scientific and technical books and periodicals, the literature being essential for the ultimate search, when bibliographies have failed, and for the preparation of digests. For the same reasons as apply in indexing the records, the information service should be based on existing autonomous information agencies, with a central index and service to deal with inquires overlapping several subjects. The established nucleus comprises the Information Service at the Science Library, supplemented by the Central Agricultural and Scientific Bibliography, now incorporated in the Society. The value of the bibliographies supplied has been proved by many severe tests. For instance, it was shown that the service could trace five times as many relevant references on a subject of inquiry as one of the largest information departments. The service corresponds almost exactly to flourishing services abroad, such as the Dutch Institute of Documentation and other similar national agencies. Our service could be developed to meet any demand by making a small charge for information supplied. Its development depends entirely on demand, and the service has been little used only because there has been little request for it.

Location of Industry

Lord McGowan on Post-War Prospects

ADDRESSING the Cardiff Business Men's Club on Tuesday last week, Lord McGowan stated that I.C.I. was contemplating a vast programme of reconstruction, extending over years and necessitating the eventual erection of many new plants. He was discussing the problem of employment after the war and he maintained that the state of affairs which led to the creation of the so-called "depressed areas" must never be allowed to recur. The drift of the manufacturing industries towards London must be checked. From the point of view of national safety it was essential that the areas on which the country's war effort so largely depended must never again be allowed to become "depressed."

In considering the location of industry, Lord McGowan said he would not be surprised if the Government took powers to tell manufacturers where they should *not* erect factories, although doing no more than recommend where they should be put. Apart from reasons of national safety, it was to the interest of industry to ensure the widest possible spread of employment. His company intended to be guided by a spirit which set less store by the strictly economic aspect. He cited as an example a war plant erected by I.C.I. in the Cardiff district, which worked with the company's factories in the Birmingham area. In normal circumstances the company would not have maintained the factory after the war, but would have extended at Birmingham instead. They had already decided against that course, and hoped to acquire the South Wales plant. He added a word of warning, from his company's long experience, against making factories too large. Where there are too many workers in one unit, they tend to regard the management as so remote as to be soulless, an attitude which, in the long run, impairs their efficiency.

Government Aid

Turning to the question of achieving full employment, Lord McGowan said that while "free enterprise" must play its part, the Government should help. It was beyond the power of "free enterprise" to secure the requisite adjustment between savings and capital expenditure without assistance from the State; but whether it was better for the State to concentrate on measures to increase consumption, or to increase capital expenditure, was a point on which there might be a difference of opinion. Industry could do much to help by a policy of evening-out the flow of capital extensions and alterations to existing plant. The State should provide conditions which were favourable to capital expenditure at a time when activity in the production of consumable goods appeared to be falling off.

Lord McGowan expressed his belief that the trade prospects of the country, in the years immediately after the peace declaration, were excellent. The change-over of plant from war to peace purposes should be made as quickly as possible, because every country would be short of many things to which they had been accustomed. To avoid an insensate boom followed by a slump, controls would still be necessary for a period, but they should not be retained a moment longer than necessary. Failing this, they would constitute the thin end of the wedge of State control, leading eventually to a regimentation of life which this country would never tolerate.

Countries such as Brazil, the Argentine, Australia, India, and China would have been deprived for five years or so of products they had previously bought from Britain, the U.S.A., and Germany, and Britain should get its share of the back-lag which was thus to be filled. He did not agree with those who thought that the hammering which Germany was getting from the air—and which we hoped that Japan would ultimately get—would put their factories out of existence for long. The Germans were as resourceful as we were, and he would not like to encourage the hope that the exports of Germany and Japan would not be as large as before the war—unless they were subject to control.

Export Trade

To make good the deficit arising from the loss of our overseas investments would call for the highest possible efficiency in both methods and machinery. He was also sure that a more comprehensive and flexible scheme for export credits would greatly enhance the chances of our post-war export drive. Brazil, the Argentina, Australia, India, China, and other such countries, might decide to manufacture articles of everyday necessity; but this would be a slow process, and he doubted whether they would be self-contained for many years. Our scientific and technical manufacturing knowledge and experience must be brought into play, and from their use we should produce refinements or luxuries which would help to balance any fall in the export of more easily manufactured products.

The future planning of industry must envisage over a long period the reversal of the 19th-century concept of accumulating industries in large agglomerations, with the attendant problems of increasingly congested areas and the inevitable accompaniment of dirt, disease, and discontent.

Parliamentary Topics

The Costly Magnesia Plant

IN the House of Commons last week, Sir Waldron Smithers followed up his question about the magnesia plant that was estimated to cost £300,000 but which finally cost about £1,600,000 (THE CHEMICAL AGE, 1944, *50*, p. 312). He asked the Minister of Supply the reason for the discrepancy, and also what disciplinary action was contemplated. Sir Andrew Duncan replied that in 1940, in order to meet an emergency, immediate steps had to be taken to provide new sources of magnesia production. Substantial risks had to be incurred with the development of an untried process. Modifications and additions to the original scheme, during construction of the plant, were such that the initial estimates of cost proved to be quite inapplicable. He was satisfied that every effort was made to keep expenditure to a minimum.

[*Editorial note*: The factory referred to is the one listed on page 9 of the report of the Select Committee on National Expenditure on "Production of Magnesium and Magnesia" as belonging to "Firm F." The committee recommended the closing of this factory, on the ground of redundancy.]

Post-War Fuel Advice

Major Lloyd George, Minister of Fuel and Power, stated that he proposed shortly to appoint a Fuel Advisory Council to advise him on certain major technical and economic problems of fuel and power production and utilisation. Within the limits imposed by war conditions his Department had already been at work on these problems and a volume of valuable information has been collected. His intention was that the Council should consist of a small number of experts in science, economics and industry. It will not have executive or regulatory functions, but he felt sure it would render valuable services especially during the reconstruction period.

Technical Training

Education for the Chemical Industry

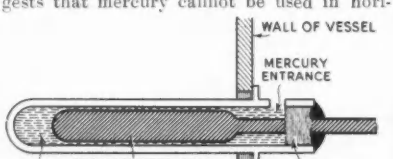
AT last month's meeting of the London Section of the British Association of Chemists, Mr. W. C. Peck presiding, Dr. T. J. Drakeley spoke on "Training for the Chemical Industries." He directed attention to the fact that our competitors possessed, not a fundamental personal superiority, but a recognised system of technical education with courses varying from those provided for the artisan to those leading to a university degree in a technical subject. He outlined the system of technical education on the continent, instancing the Technical High School at Delft, the Zurich Polytechnic, and other Technical High Schools. By way of contrast, in December, 1937, the Senate of London University rejected a proposal for forming a Faculty of Technology. No reasons had been given, but such a decision showed the inferior opinion held of technological studies.

Dr. Drakeley then turned to the Report of the Chemical Education Advisory Board where it was laid down that, in all cases, the study of a branch of applied chemistry should follow on a course in pure science up to at least degree standard. This presumed that the training for the first three years should be the same for whatever chemical occupation the student eventually desired to enter. Surely it was impossible to justify the view that the metal chemist should have the same training as the rubber chemist. He did not suggest we should slavishly copy the Continental system of technical education, but there was surely something we could learn from it. What we needed was the adoption of a fully recognised scheme of technical education as a counterpart of the present secondary-school/academic-university ladder and with equal standing.

LETTER TO THE EDITOR

Temperature Measurement

SIR,—In an article in THE CHEMICAL AGE of March 25 on "Temperature Measurement," the author, Mr. H. F. Barnes, suggests that mercury cannot be used in horizontal pockets. This is not so, and I append a sketch of a suitable pocket which I have seen in extensive use both for glass and for mercury-in-steel instruments.



Place bulb in pocket, fit asbestos string round bulb stem, and tamp home fairly tightly. A small amount of ordinary magnesia compo is wetted and placed upon string. Mercury can then be poured in through hole in side.

With the exception of this small criticism, I should like to congratulate Mr. Barnes on his sound practical knowledge of his subject, and his interesting presentation of the same.—Yours faithfully,

W. PERCIVAL.

March 31, 1944.

Personal Notes

MR. C. J. PRATT has been appointed works manager of Chemo Metals (London), Ltd.

MR. K. TOMLINSON has become chemist and works manager of Solo Laboratories, Ltd.

MR. H. W. CREMER has become a member of the National Physical Laboratory's executive committee.

PROFESSOR F. H. GARNER has been elected president of the Institute of Petroleum for 1944-45 in succession to Mr. C. Dalley.

MR. L. S. KINNEAR, secretary of the British Oxygen Co., Ltd., has been appointed to a seat on the board.

MR. ESSINGTON LEWIS, Director-General of Munitions and Director-General of Aircraft Production for Australia, has been awarded the Bessemer Gold Medal of the Iron and Steel Institute for 1944, in recognition of his outstanding services to the iron and steel industry of Australia.

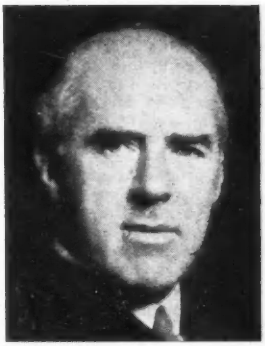
MR ADAM WILSON, chairman of the Explosives Division of I.C.I., who has completed 50 years' service, was presented by his colleagues on March 31 with a solid silver antique salver and a cheque. He remarked that Lord McGowan was the only person still in active service who was with Nobel's when he joined the firm as a boy.

MAJOR W. R. BROWN, D.S.O., has been appointed a director of The Power-Gas Corporation, Ltd., and MR. W. R. BESWICK (London manager), MR. R. W. RUTHERFORD (technical sales manager), and MR. CHARLES ROBSON (secretary) have been appointed directors of Ashmore, Benson, Pease & Co., Ltd.

MR. VICTOR BLAGDEN has this year completed 21 years' service as president of the British Chemical and Dyestuffs Traders' Association, and in commemoration of the occasion the members are presenting to the Association his portrait in oils painted by Mr. Maurice Codner. The presentation will be made at the Savoy on May 16 at the first Association luncheon since 1939. Mr. Blagden, who has spent over 50 years in the City of London, was elected first chairman and president when the Association was formed in 1923.

The officers and executive committee of the British Disinfectant Manufacturers' Association for the current year are as follows: *Chairman*, MR. V. G. GIBBS, Wm. Pearson, Ltd.; *vice-chairman*, MR. P. J. BOVILL, Newton Chambers Co., Ltd.; *hon. treasurer*, MR. R. A. BLAIR, Burt Boulton & Hayward, Ltd.; *hon. auditor*, MR. R. G. BERCHEM, Jeyes Sanitary Compounds Co., Ltd. *Executive Committee*: MR. T. C. BETTERIDGE, Cooper McDougall & Robertson, Ltd.; MR. A. J. BLACK, Lysol, Ltd.; MR. A. DODD, Monsanto Chemical Co., Ltd.; MR. H. W. MACKRILL, Hull Chemical Works, Ltd.; MR. H. A. SMITH, Lawes Chemical Co., Ltd.; MR. H. M. SPACKMAN, Jeyes Sanitary Compounds Co., Ltd.; MR. E. A. DUSSEK, Dussek Bros. & Co., Ltd.; MR. R. F. A. SAMPSON, Newton Chambers & Co., Ltd.; MR. F. C. SEAGER, Wm. Pearson, Ltd.; MR. J. E. WELLS, Sanitas Co., Ltd.

ALDERMAN EDWIN THOMPSON, governing director of Manesty Machines, Ltd., and of Thompson & Capper Wholesale, Ltd., Liverpool, has been appointed by the King to be Sheriff of the County Palatine of Lancaster.



Alderman Edwin Thompson.

Mr. Thompson was Lord Mayor of Liverpool in 1930/31, president of the British Waterworks Association in 1931, and president of the Society of Chemical Industry in 1934/35. He originated the scheme which led to the foundation of the Lancashire Industrial Development Council, and has been a magistrate since 1923 and a City Councillor since 1915.

Obituary

MR. GEORGE H. HOWSE, a director of Thomas Howse, Ltd., the paint manufacturers, died on March 21, aged 58.

MR. HERBERT GEORGE FINCH, director of Barry & Staines Linoleum, Ltd., and of Barry, Ostlere & Shepherd, Ltd., died at Kirkcaldy on April 2, aged 71.

DR. IDA SMEDLEY MCLEAN, the distinguished woman biochemist and a member of the staff of the Lister Institute, died on March 2, aged 66. She was a recognised authority on fat metabolism. From 1929 to 1935, she held the presidency of the British Federation of University Women.

The death of ALDERMAN WILLIAM ROSE at Truro has removed a personality who was prominent for many years in the China Clay industry. Mr. Rose, a native of London, removed to Cornwall in 1894 upon the

establishment of the firm of Messrs. North and Rose at St. Austell. Mr. Rose served the clay trade until he was well over 80 years of age. For half a century he was a member of Truro City Council.

The death occurred recently of MR. ROBERT MONTEITH MACNAUGHT, aged 65. He was appointed chief engineer to the British Ore Concentration Co., Ltd., in 1903, and then from 1904 to 1922 he served with the Mond Nickel Co. as engineer and works chemist. During his 40 years in chemical engineering he was also with A. Boake, Roberts & Co., Ltd., as chief engineer, and the Lennox Foundry Co., Ltd. He had been a member of the Institution of Chemical Engineers since 1925.

The death is reported from Melbourne of MR. WALTER PERCY RIAL, aged 51. A graduate of the Royal College of Science, he joined the firm of Bagley, Mills & Co., Ltd., as chemist, in 1919. Three years later he became chief chemist and purification engineer of the Shanghai Waterworks. With the fall of Shanghai he was taken prisoner, but in August, 1942, he was released under the exchange agreement between Britain and Japan, and went to Australia, to become engineer to the Water Supply Commission of Victoria. He was an F.I.C. since 1927, and an M.I.Chem.E., since 1924.

SIR CHARLES VERNON BOYS, LL.D., F.R.S., the distinguished physicist, died on March 30 at St. Mary Bourne, Hampshire. He was 89 last month. He was especially well known for his work on fine quartz fibres and for his method of utilising their torsion for the measurement of extremely small forces. Other subjects to which he had devoted much attention were the photography of lightning flashes and the physics of soap bubbles. His instruments for the measurement of the heating value of gas were adopted as standard, and he was appointed one of the Metropolitan Gas Referees as long ago as 1897. Elected F.R.S. in 1888, he was a medallist not only of the Royal Society, but also of the Physical Society and the Franklin Institute. In 1939 he published a new edition of his popular handbook, *Weeds, Weeds, Weeds*, and among his more strictly scientific works, his *Soap Bubbles, their Colours, and the Forces which Mould Them* is a classic.

MR. JOHN SIMPSON FORD, F.R.S.E., F.R.I.C., who died in Edinburgh on March 27, was a director of William Younger & Co., the Edinburgh brewers, and had played a leading part in the scientific development of British brewing. He was educated in Edinburgh at the Royal High School and the University, where he worked under Crum Brown and was awarded the Hope Prize Scholarship as the most distinguished laboratory student of his year. After two years as junior assistant and demonstrator there, he was appointed chemist to William Younger & Co. in 1889, and proceeded to organise a laboratory system of analysis and control, being a pioneer in the introduction of scientific methods into the art of brewing. Three months in Copenhagen in 1895 with Kjeldahl and Hansen furthered his knowledge, and his research work was recognised by the award of a Fellowship in the Royal Society of Edinburgh and by the Horace Brown Memorial Medal of the Institute of Brewing. His Fellowship of the Royal Institute of Chemistry dates from 1918.

General News——From Week to Week

An immediate national cut in supplies of electricity and gas for industrial purposes has been ordered by the Ministry of Fuel and Power. Electricity will be cut by 10 per cent. and gas by 25 per cent. Domestic supplies are not being cut.

After the war the Board of Trade will take a census of production every year, instead of at five-year intervals as in the past. This information was given by the Board's chief statistician, Dr. H. Leak, at a meeting of the Royal Statistical Society.

The Ministry of Food is considering making a Maximum Prices Order for vinegar. Any manufacturer who wishes to make representations on the subject should communicate with the Ministry of Food, St. John's College, Oxford, not later than April 30.

Amended Poisons Rules (S.R. & O. 1944, No. 283) provide for the exemption of insecticides consisting of nicotine dusts containing not more than 4 per cent. of nicotine from provisions of Section 18(2) of the Pharmacy and Poisons Act, 1933. The general restrictions included in Part II of the Poisons List and Schedules I and VIII to the Poisons Rules are not otherwise affected by the new Rules.

A photometer devised by Mr. G. Wortley, of the Ministry of Supply, in order to measure the obscuration of transparent plastic surfaces produced by abrasion, is described in the *Journal of Scientific Instruments*, March, 1944, p. 42. Another article in this issue deals with a simple valve amplifier designed to measure the potentials of high-resistance glass electrodes (as used for determining *p*H values).

The development scheme of the North of Scotland Hydro-Electric Board lists 102 projects with a potential annual output of 6274 million units. Copies of the scheme are available for inspection at the Board's Offices at 16 Rothesay Terrace, Edinburgh.

Negotiations are proceeding in Lisbon and Madrid regarding exports of wolfram to the enemy. In the House of Commons last week, Mr. Dingle Foot, P.P.S. to the Ministry of Economic Warfare, stated that until these negotiations are concluded it is impossible to forecast the quantity of wolfram the United Nations will purchase in the Iberian peninsula.

The Parliamentary and Scientific Committee is urging the Chancellor of the Exchequer to make subscriptions to learned societies free of income tax. The committee's memorandum on taxation and research has already been discussed with Sir Cornelius Gregg, of the Treasury, and it is hoped that the Treasury will receive a deputation on this subject before the Budget.

Corporate membership of the Parliamentary and Scientific Committee has been granted to the Chemical Society, Physical Society, Institute of the Plastics Industry, and British Non-Ferrous Metals Research Association. The application of the Tin Research Institute has been approved by the committee subject to annual re-election so that the committee may be assured that this Research Institute continues to be domiciled in Britain and that British interests on the International controlling body are adequate.

The Association of Scientific Workers and the Scottish Convention at their recent joint meeting in Edinburgh discussed the projected hydro-electric scheme for Scotland. Dr. George Muir said that once the power was available the enormous dolomite resources of the Durness region and the limestone of Fort William could be developed. A magnesium industry would be possible, probably in the Lairg-Dingwall area, and a carbide industry north of Fort William; in association with the latter plastics and synthetic rubber industries could be developed.

The Control of Rubber (No. 22) Order (S.R. & O. 1944, No. 353), issued by the Minister of Supply and effective from April 1, revokes the Control of Rubber (No. 16) Order which at present controls the acquisition of belting and also its technical specifications. Minimum natural rubber content of belting (revised to take account of use of synthetic rubber) will in future be prescribed by the Rubber Control in its licences for the consumption of natural rubber issued under the Control of Rubber (No. 15) Order. Planning and progressing of the manufacture of conveyor and elevator belting is now being administered by the Ministry of Fuel and Power.

The annual report of the Imperial Institute for 1943, just published, contains a useful summary of the investigations made on colonial products, including derris root from St. Lucia, seaweed (*Gigartina*) from New Zealand, peat wax from Chatham Islands, bauxite from Jamaica and Nyasaland, and pollucite from South Africa—to mention only those products of immediate interest to the chemical industry.

A war-emergency revision of B.S. 489-1933, Turbine Oils, has been issued by the B.S.I. The revision affects the table of grades, and two new grades are now included, these being alternatives to the existing heavy and extra-heavy grades and having a lower cold test. A modification has also been made to the method of test for deleterious sulphur. Copies (ref. P.D. 211) may be obtained gratis, on receipt of a stamped addressed envelope, from the B.S.I., 28 Victoria Street, London, S.W.1.

The Ministry of Food, in conjunction with the Ministry of Home Security, is holding a series of courses to train food-factory chemists as industrial gas identification officers. The courses will be open to public analysts and members of their staffs, but only to chemists who possess a recognised professional qualification. The courses last three days (probably over week-ends). Further details can be obtained from the Gas Precautions Branch, M.O.F., Norfolk House, Colwyn Bay,

At Forfar Sheriff Court on March 29, Tecalemit, Ltd., pleaded not guilty to the charge of having caused or permitted poisonous matter to flow into the South Esk. The prosecution stated that 359 salmon, 30 sea trout, a large number of parr and other fish were found dead, and that samples of the water contained poisonous quantities of zinc salts and cyanide. Defendants admitted that from 20 to 25 gallons of zinc solution were permitted into the lade, but contended that the flow into the river was too slow to have killed the fish. Sheriff MacKinnon held that defendants were entitled to the benefit of the doubt, and he returned a verdict of not proven.

Foreign News

Exports of eucalyptus oil from Australia fell from 190,192 gallons in 1941-42 to 51,945 in 1942-43.

The first commercial production of a new wool-like fibre from soya bean has started in Cincinnati in a plant of the Drackett Co. Five years ago this fibre was a laboratory curiosity costing $400 per lb., but present production will result in its being marketed at a price permitting widespread use in textiles and fabrics. The Drackett Co. is one of the biggest concerns processing soya beans: its output of soya-bean oil, for instance, is 30 million lb. a year.

A patent has been granted in the United States for a glass cleaner consisting of an aqueous solution of 20-50 per cent. methyl, ethyl, or propyl alcohol in which 0.02 to 0.2 per cent. tetra sodium (or potassium) pyrophosphate is added to prevent haze formation.

The fatty acid composition of tobacco seed oil is described by C. Venkatarao, M. Narasingarao and A. Venkateswarulu in the *Journal of the Indian Chemical Society* (1943, *20*, 11, p. 375). The mixed fatty acids consist of myristic (1.8 per cent.), palmitic (7.8), stearic (5.6), oleic (30.2), and linoleic (54.6). The percentage of non-saponifiable matter, mainly sitosterol, is 1.9.

Rock bursts, a major cause of injury to miners, can be predicted by equipment developed by Canadian scientists who have been studying the subject for 5 years. By embedding delicate instruments 30 feet in the rock, and interpreting supersonic recordings, it is reported that rock-burst occurrences can be predicted with sufficient accuracy to eliminate much of the danger.

W.P.B., Washington, has ordered the immediate closing of four aluminium "pot-lines" in the New York area. A pot-line is the plant that produces aluminium from alumina. In view of the present ample production of aluminium ingots, the output of these four plants can be dispensed with and the saving in coal will be 70,800 tons a month.

Record quantities of lead, zinc, and copper were produced during last year by San Francisco Mines of Mexico, Ltd., according to the chairman's report at the annual meeting. Improved metallurgy has produced a lead concentrate assaying about 69 per cent. (as against 57/58 per cent. in past years), and a 27 per cent. copper concentrate, formerly left in the lead concentrate, is now in regular production.

The Dow Chemical Company of Canada, already operating two units at the Polymer Corporation, may extend its operations, in the Sarnia area of Ontario, to include the production of chemical products for which the parent company of Midland, Michigan, is noted. Recent reports circulating in Canada suggest that a plastics industry may arise in Sarnia as an offshoot of the Dow synthetic rubber plant.

The Rubber Development Corporation of the United States announces that the U.S. synthetic rubber programme has failed to produce expected supplies, making the need for the natural product more urgent. Mr. Bradley Dewey, U.S. Rubber Director, has stated that the January production of synthetic rubber in the U.S. totalled nearly 50,000 tons. Production is expected to reach 75,000 tons per month by the second half of 1944.

The Australasian Institute of Mining and Metallurgy celebrated its jubilee last December. To mark the occasion, nine mining and metallurgical experts were elected honorary members, including Mr. J. Allen Howe, O.B.E., as president of the Institution of Mining and Metallurgy.

America's armed forces have a new and powerful chemical weapon, called D.D.T., against body-lice. This insecticide, in experimental tests, was found to render a room obnoxious to house-flies for a period of three months, and also proved highly effective against a variety of other insect pests, thus offering wide possibilities for post-war use. The entire output is reserved for the U.S. Army and Navy with the exception of samples for laboratory experiments.

The U.S. War Man-power Commission has rejected an application by spokesmen of the American chemical industries to include a comprehensive list of key workers in their field on the critical list. It is anticipated that the result will be a continued loss of skilled personnel to the armed forces, and to so-called war industries that are no more important than chemical factories.

The inherent capacity of many classes of plastics to become highly charged electrostatically is the subject of an article in the German technical paper *Die Waerme*, of which a translation has appeared in *British Plastics* recently. The author points out that this fact constitutes a danger in factories making detonators and explosives, or if explosive mixtures of gas, vapour or dust with air are present. He adds that the high electrostatic charges restrict the use of synthetic bristles in brooms.

A chemical de-salter for converting sea water into drinkable water is being produced and packed in 3½ lb. kits by the Permutit Co. of New York. The kit consists of a plastic bag for holding the water, and 14 chemical bricks which are used to purify the water. One brick when disintegrated by the water will produce a pint of drinkable water in about twenty minutes. It is expected that this kit will be of particular use to castaway sailors or airmen who have been forced down at sea.

Pure tungsten may be produced directly from tungsten ore, according to a new method which is claimed to have succeeded under laboratory tests in America. The new process, in which crystalline tungsten is produced electrolytically from a fused borate or phosphate bath, using tungsten ore as the direct source of tungsten, has been developed by Dr. G. Fink, of Columbia University, New York. The tungsten in the ore used does not require preliminary transformation into alkali tungsten, as in older processes. The method may be applied to low-grade ores as well as to high-grade concentrates, and is reported to be commercially useful.

The value of propylene glycol as a solvent for use in pharmacy is assessed in an article by John Rae in *The Pharmaceutical Journal* (March 25, 1944, p. 122). In the United States it is permitted to replace glycerine by this substance in many preparations on the National Formulary.

Forthcoming Events

The Road and Building Materials Group of the **Society of Chemical Industry** meets on **April 12,** at 5 p.m., at 1 Grosvenor Place, London, S.W.1, when Mr. Colin Gullen will read a paper on "Modern Developments in the Manufacture and Control of Cement."

Mr. C. Diamond will give a lecture entitled "Chemical Research in Rayon and Allied Materials—A Retrospect" to the Birmingham Section of the **Society of Chemical Industry** on **April 13,** at 6 p.m. The meeting will be held in the Chamber of Commerce, New Street.

The Scottish Section of the **Society of Dyers and Colourists** has arranged a meeting, to which members of the **Royal Institute of Chemistry** are invited, for 7 p.m. on **April 13** in Room 24, Royal Technical College, Glasgow, when Dr. H. Hunter will lecture on "The Electron Microscope."

The annual general meeting of the Leicester Section of the **Institution of the Rubber Industry** takes place on **April 13,** at 7 p.m., at the Grand Hotel, Leicester. This meeting will be followed by three films respectively entitled "Robots and Rubber," "Millroom of the Future" and "Rubber in the Rouge."

The 22nd annual meeting of the **Institution of Chemical Engineers** will be held on **April 14** at the Connaught Rooms, Great Queen Street, W.C.2. The business meeting starts at 11 a.m., to be followed by the address of the president, Mr. F. A. Greene, on the subject of "Our Title: A Reminder." The luncheon is arranged for 1 p.m., and at 3 p.m., Mr. J. G. Bennett, director of the B.C.U.R.A., will deliver the first Reavell lecture, on "Coal and the Chemical Industry."

A meeting of the Plastics Group of the **Society of Chemical Industry** will be held on **April 14,** at 2.30 p.m., in the rooms of the Institute of Electrical Engineers, Savoy Place, London, W.C.2, when a symposium will be held on "Electrical Properties on Plastics." The following papers will be read: "A Survey of Thermal Plastics as Dielectrics," by H. A. Nancarrow, M.Sc., F.Inst.P.; "The Principles of High Frequency Heating," by Dr. L. Hartshorn, A.M.I.E.E.; "Tracking," by E. Rushton, B.Sc., A.M.I.E.E. Members of the Institute of the Plastics Industry are invited.

The Tees-side Sections of the **Royal Institute of Chemistry** and the **Society of Chemical Industry** are holding a joint meeting on **April 15,** at 2.30 p.m., when Dr. U. R. Evans is to lecture on "Some Researches into Metallic Corrosion."

Company News

The British Oxygen Co., Ltd., announces a final dividend of 8 per cent., making a total for 1942 of 15 per cent. (same).

General Refractories, Ltd., report a net profit of £49,403 (£60,585), and are again proposing a dividend of 7½ per cent.

William Blythe and Co., Ltd., are paying a final dividend of 10 per cent., making 15 per cent. (same) for the year. The year's profit was £40,936) (£40,278).

The Manganese Bronze and Brass Co., Ltd., has declared a final dividend of 17½ per cent., making 25 per cent. (same) for the year. Profit, after taxation, was £57,905 (£47,469).

New Companies Registered

Deverminators, Ltd. (385,936).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of insecticides, fungicides, disinfectants, agricultural and horticultural products, etc. Subscribers: J. Peace, Glenhaven, Gloucester Gate, London, N.W.1; Mrs. G. L. Tengwall.

United Industrial Technologists, Ltd. (386,187).—Private company. Capital: £1000 in 1000 shares of £1 each. Consulting engineers, chemists, technologists, designers, etc. Subscribers: F. Grundy; T. E. Thomas. Registered office: 31 Fairview Avenue, Levenshulme, Manchester.

S. T. Chemicals, Ltd. (385,879).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and dealers in chemicals, fertilisers, glues, pigments, oils, and laboratory equipment, etc. Subscribers: E. Stekel, B. Stekel. Registered office: 17 Folgate Street, London, E.1.

Sno-Wyte Chemical Co., Ltd. (385,733).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in chemicals, drugs, proprietary articles, etc. Directors: H. F. Keen; W. R. Carter, both of 411 Oxford Street, London, W.1.

Deanhead Chemical Co., Ltd. (386,535).—Private company. Capital: £4000 in 4000 shares of £1 each. Tar distillers, chemical and dye manufacturers, soap boilers, dealers in residual products, etc. Directors: T. Chadwick, A. Smith, W. Cryer. Registered office: Paragon Works Smithy Bridge, Littleborough, Lancs.

Re-Agent Discoveries, Ltd. (385,790).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and

dealers in chemicals, drugs, fertilisers, foodstuffs, oils, scientific equipment, etc. Directors: F. W. Witchalls; Winifred M. Turner. Registered office: 75-77 Shaftesbury Avenue, London, W.1.

Vacuum Salt, Ltd. (386,009).—Private company. Capital: £9000 in 9000 shares of £1 each. Salt proprietors and miners, brine pumpers, white salt manufacturers, alkali and chemical manufacturers, etc. Directors: W. H. Westhead, J. G. Bloor, W. A. Hamlett, R. W. Hamlett. Registered office: 1 Martin Street, Stafford.

Radium Luminous Industries, Ltd. (385,761).—Private company. Capital: £100 in 100 shares of £1 each. Preparers, manufacturers and appliers of luminous compounds, metal workers, manufacturers of radium, glass, plastics, etc. Subscribers: H. R. Thomas and Mrs. M. G. Llewellyn. Registered office: 21, Morrish Road, London, S.W.2.

Sanderson and Company (Overseas), Ltd. (386,181).—Private company. Capital: £2000 in 20,000 shares of 2s. each. General merchants, importers and exporters of chemicals, plastics, textiles, metals, rubber, oil, etc. Directors: G. B. Owen; C. F. Hall; F. Le Roux; F. C. Lovenbach. Registered office: Plantation House, 31-34 Fenchurch Street, E.C.3.

Reliance Plastics Ltd. (385,858).—Private company. Capital: £100 in 100 shares of £1 each. Manufacturers of and dealers in plastic moulding, wood and metal materials and compounds, natural or synthetic plastic substances, chemical products, etc. Subscribers: F. C. Jones and S. R. Simpson. Solicitors: Mawby Barrie and Letts, 55-61, Moorgate, London, E.C.2.

Saxa Salt Company, Ltd. (385,927).—Private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in "Saxa Salt," prepared foods and medicines, owners of salt mines and brine works, etc. Directors: W. H. Collins, J. Weedy, R. France, W. A. Innes, F. N. Patterson, R. V. Townsend. Registered office: Greatham, Durham.

Nutfield Manufacturing Company, Ltd. (386,482).—Private company. Capital: £10,000 in 10,000 shares of £1 each. To acquire the business of a chemical and sulphuric acid manufacturer carried on by Frank Stubbs, at Kingsmill Works, S. Nutfield, Surrey. Directors: F. Stubbs, Mrs. L. Eccles, T. A. Eccles, A. G. Mayhew. Registered office: Kingsmill Works, S. Nutfield, Surrey.

Stand, Ltd. (385,816).—Private company. Capital: £1000 in 100 shares of £10 each. Managers, consultants, etc., in connection with enterprises engaged in the production, use or sale of aluminium or other metals, chemical, electro-chemical or electro-metallurgical products, etc. Subscribers: P. J. Davis and S. J. Davis. Solicitors: Bulcraig & Davis, Amberley House, Norfolk Street, London, W.C.2.

Bardon Mill Collieries, Ltd. (386,112).—Private company. Capital: £50,000 in 500,000 shares of 2s. each. Colliery proprietors, mine and quarry owners, manufacturers of and dealers in sulphate of ammonia, benzol, pitch, tar, creosote, ammonium dyes, colours and by-products, etc. Directors: H. J. Bernthal; Capt. H. J. Bernthal, jnr.; G. R. Pepperell. Registered office: Pilgrim Hotel, Pilgrim Street, Newcastle-on-Tyne.

Chemical and Allied Stocks and Shares

GENERAL conditions in Stock Exchange markets have remained steady under the lead of British Funds, although business has again been on a moderate scale. Holiday influences and a disposition to await the Budget were among factors which governed sentiment. Movements among shares of companies connected with the chemical and kindred industries were mostly small. Imperial Chemical remained at 38s. 6d., awaiting the forthcoming dividend announcement, and the 7 per cent. preference shares were 35s. Turner & Newall further improved from 81s. 3d. to 82s., while Goodlass Wall 10s. ordinary, which were also favoured on hopeful views as to scope for higher earnings and dividends after the war, have been firm at 17s. 3d.

Many shares favoured on after-the-war prospects continue to show only moderate yields, including Borax Consolidated deferred, which at 36s. 4½d. were the same as a week ago. The assumption in regard to these is that there seem good possibilities that the dividend will remain on a 7½ per cent. basis during the remainder of the war. Following publication of the financial results, General Refractories 10s. shares have rallied to 16s. 3d., as it is recognised that the dividend (again 7½ per cent.) is conservative and permits a further £25,000 to be added to reserve. United Molasses have been more active on indications as to the continuance of the company's progressive policy, and have further improved from 32s. 7½d. to 33s. In other directions, Imperial Smelting strengthened to 13s. 7½d. Triplex Glass 10s. ordinary were 36s. 4½d., at which there is only a very small yield on the basis of last year's 10 per cent. dividend. The small yield, however, reflects the strong balance-sheet position and hopes that after the war there may be a gradual return to the 25 per cent. dividends which ruled in the past. United Glass Bottle ordinary have been steady around 61s., following the annual meeting where the strength of the financial position was indicated by the chairman. It was also mentioned that the company's turnover increased last year, but

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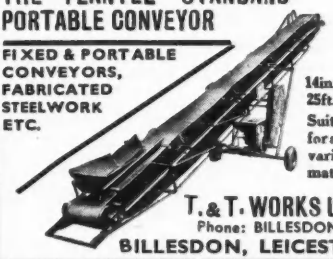

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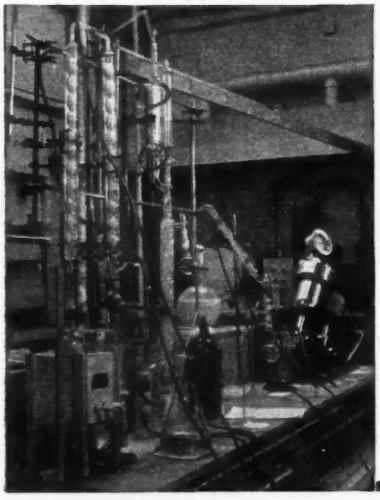

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that, on the other hand, the profit ratio was lower because there was no adjustment of selling prices to meet increased costs.

Iron, steel, and allied shares have remained firmer under the influence of hopeful views as to the steel that will be required after the war for prefabricated houses and similar purposes. Stewarts & Lloyds deferred have further improved from 54s. 7½d. to 55s., Guest Keen from 35s. 4½d. to 36s., and Consett Iron 6s. 8d. shares from 7s. 3d. to 7s. 4½d., while Richard Thomas 6s. 8d. ordinary strengthened to 10s. Elsewhere, Tube Investments have been firm at 96s., and Babcock & Wilcox were better at 49s. 9d. Allied Ironfounders moved slightly higher to 50s. 3d., and Amalgamated Metal were 17s. 6d. Steadiness has been shown in British Aluminium at 47s. 3d., while Murex were 102s. 6d., and Metal Box 89s. 4½d. In textiles, British Celanese remained at 27s.; Courtaulds were firmer at 52s. 9d. following the annual meeting; Bradford Dyers eased slightly from 21s. 3d. to 21s.; and Bleachers were 9s. 6d.

Among plastics concerns De La Rue were higher at 167s. 6d., Erinoid 10s. ordinary again 11s., and British Industrial Plastics 6s. 7½d. Elsewhere, paint shares again tended to move better; Lewis Berger were 102s. 6d. pending declaration of the interim dividend. British Plaster Board were 29s. 10½d., and Associated Cement again 63s. B. Laporte remained firmly held and quoted at 76s 3d. Burt Boulton kept at 22s. 6d., pending the interim dividend announcement, while Monsanto Chemicals 5½ per cent. preference were 23s., and Greeff-Chemicals 5s. ordinary again 7s. 3d. Steadiness has been shown in Boots Drug at 42s. 6d. Nairn & Greenwich were maintained at 73s. 9d., and Wall Paper Manufacturers deferred at 38s. 6d. Anglo-Iranian and other leading oil shares have shown small movements but were inclined to improve.

British Chemical Prices

Market Reports

CONDITIONS ruling the London industrial chemicals market have undergone no material change during the past week, and fair inquiry has been reported for new business, while prices are steady in nearly all sections. Contract deliveries continue to occupy the chief attention and the flow in this direction is regarded as satisfactory. The soda products generally are active, with chlorate of soda in short supply, while a good demand is in evidence for caustic soda and nitrate of soda. Pressure for supplies of Glauber salt and salt cake has been maintained and both grades of hyposulphite of soda are in good demand. Among the potash compounds, British-made permanganate remains a strong market, and a persistent call for supplies of both the B.P. and technical grades is reported. Acid phosphate of potash is in good demand and quotations are firm. Contract deliveries of most descriptions of coal-tar products during the past week have been steadily maintained, and a moderate weight of new business has been reported where supplies of materials are available. All grades of creosote oil, both light and heavy, are finding a ready outlet, while a tight supply position in respect of the anthracene oils continues to be reported. The benzols and toluols are in steady request.

MANCHESTER.—Up to the present there has been little indication of any easing of the demand for industrial chemicals on the Manchester market, though the end of the present week and the greater part of next week will witness a marked seasonal contraction in the flow of specifications, as well as in the volume of new inquiry and actual business. In the meantime good quantities of most of the soda products are being taken by consumers in the north-west area, and most of the other leading heavy chemicals are a steady trade also. So far as prices are concerned actual changes have been few, but there is no doubting the strong undertone of the market generally.

GLASGOW.—In the Scottish heavy chemical trade the improvement reported last week has been maintained for home business. Export trade still remains rather restricted. Prices keep very firm.

Price Changes

Barium Carbonate.—Precip., 4-ton lots, £17 per ton d/d; 2-ton lots, £17 5s. per ton, d/d.

Rapeseed Oil.—For the period ending May 6: crude, £85 per ton, naked, ex works.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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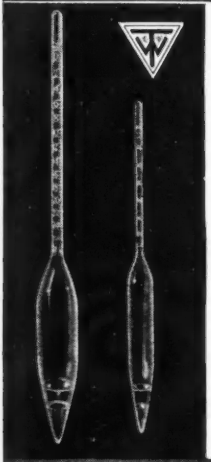

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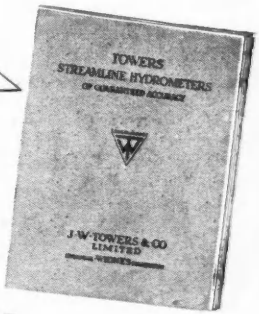

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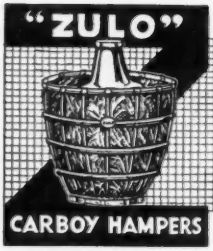

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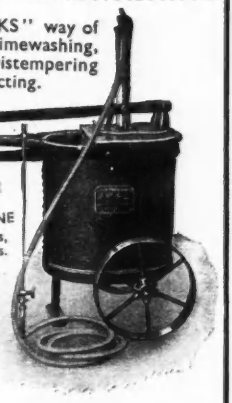

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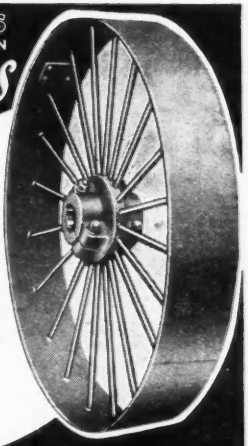

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